

APPENDIX F
RARE, THREATENED, AND ENDANGERED PLANT SURVEY

RARE, THREATENED, AND ENDANGERED PLANT SURVEY

EMERALD CREEK GARNET LTD

FERNWOOD, IDAHO

FINAL Report submitted to:

**Emerald Creek Garnet LTD
PO Box 190
Fernwood, Idaho 83830
(208) 245-2096**

Prepared by:

**Tom Duebendorfer
PO Box 167
Elmira, Idaho 83865
(208) 660-1494
tdueb@nidlink.com**

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Report Preface

This Biological Assessment (BA) has been prepared for use by Emerald Creek Garnet Company and its agents. I, Tom Duebendorfer, am qualified to analyze terrestrial and wetland ecosystems. I hold a master's degree in Biology, I am a Professional Wetland Scientist (#000157, Society of Wetland Scientists), a Certified Wetland Delineator (US Army Corps of Engineers, Seattle District), and have 19 years experience in assessing Northwest province ecosystems. I have used the site information and proposed plans as referenced herein. The findings in this report are based on information gathered in the field at the time of investigation and my understanding of the federal, state, and local regulations governing species protection. Prior to construction, all appropriate regulatory agencies should be contacted to concur with the findings of this report and to obtain appropriate approvals and permits.

The Rare Plant Survey has been presented using thorough application of my knowledge and experience, correspondence with regional experts, and best professional judgment based on the circumstances and site conditions at the time of the study. The final decisions are made by the appropriate federal, state, and local jurisdiction. I have provided professional services in accordance with the degree of care and skill generally accepted in the nature of the work performed.

Tom Duebendorfer M.A., PWS
Wetland Scientist/Biologist/Botanist

Surveys for federally listed threatened and endangered plant species were completed for Emerald Creek Garnet LTD (ECG) in St. Maries River basin, near Fernwood, Idaho. As part of an Environmental Impact Statement (EIS) required by the US Army Corps of Engineers (Corps), a survey was undertaken to assess the presence, absence, and/or extent of threatened and endangered plant species that occur within the 1998 Study Areas.

Under provisions of the Endangered Species Act (ESA), federal agencies (in this case, the Corps) are directed to seek to conserve endangered and threatened species and to ensure that actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of any endangered and threatened species known or that may occur in the project area. This report provides documentation to meet federal concerns and satisfy the requirements outlined in Section 7(c) of the ESA of 1973 and amendments.

1.1 Site Location

The project area, located approximately 2 to 4 miles southeast of Fernwood, Idaho, lies within an southwest/northeast oriented watershed that drains to the St. Maries River (Figure 1). The St. Maries River is tributary to the Columbia River through Lake Coeur d'Alene and the Spokane River. The project area is specifically located in the St. Maries River floodplain north of the river to State Route 3, and in some areas, historical floodplain areas north of State Route 3. For convenience, the project area has been divided into seven specific study areas. These are described in Table 1 and shown on Figure 2. All study areas are on private property in Benewah or Shoshone County. The total areal extent of the project area is 355.8 acres. Site elevation is around 2700 feet (823 m).

Table 1
Study Areas Locations

Study Area	General Location	Legal Description ¹	Areal Extent (acres)
1	S of SR 3, near the ECG offices downstream (west) to Hatton Creek (NW 1/4 of NW 1/4 Section 9)	Sections 15, 16, 9	137.8
2	S of SR 3, upstream of the ECG offices	Section 15	7.9
3	N of SR 3 and the ECG offices	Sections 15, 16	7.5
4	S of SR 3, from west of Olsen Creek west to near west edge of Study Area 1	Sections 9	13.1
5	N of SR 3 between Hatton Creek and Pierce Creek	Sections 8, 9	41.8
6	S of SR 3, from near Hatton Creek west to common Section line 5/6	Sections 9, 8, 5	137.2
7	N of SR 3, upstream of Adams Creek	Sections 5	10.5
		TOTAL	355.8

¹ all Sections are in Township 43 North, Range 1 East

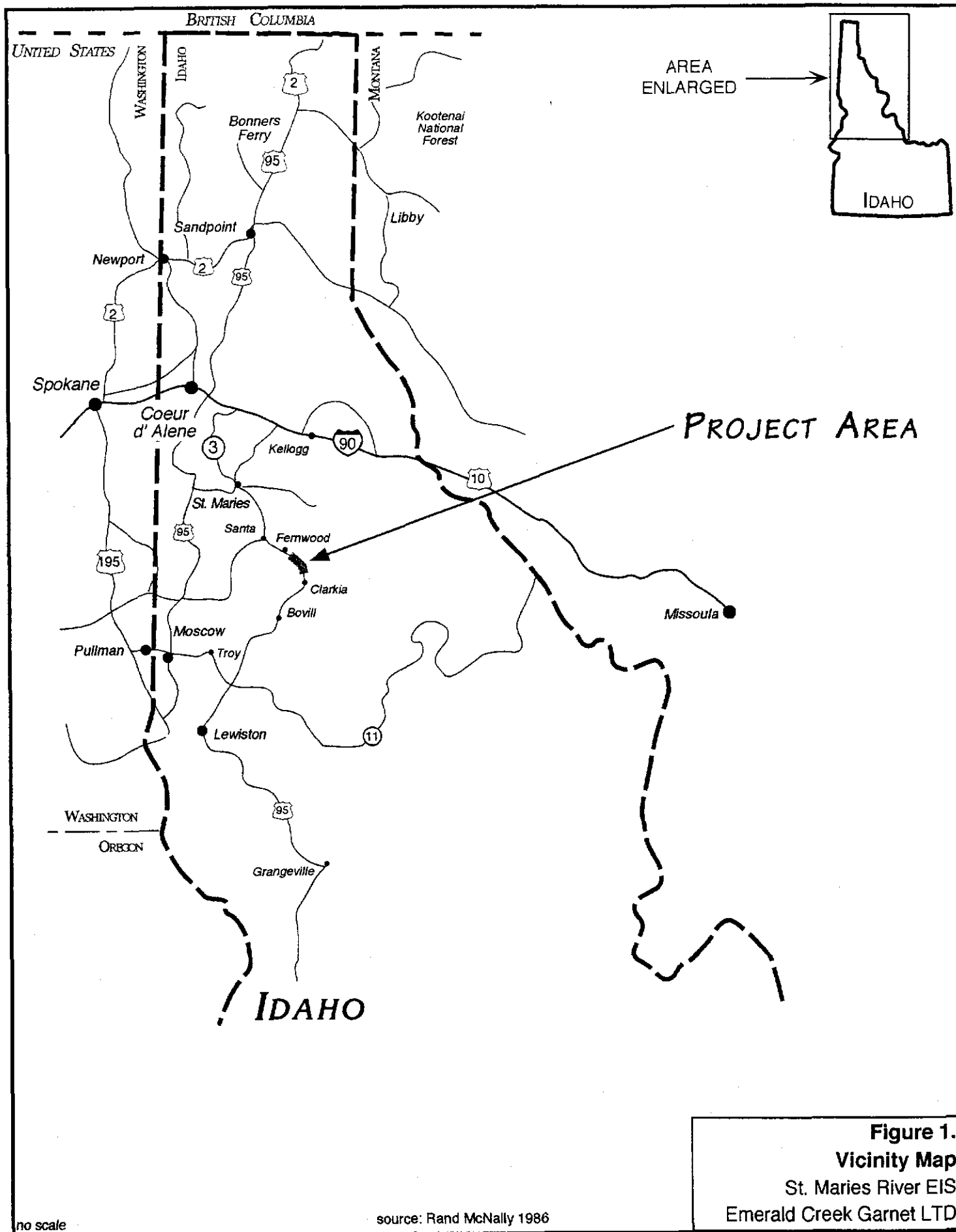
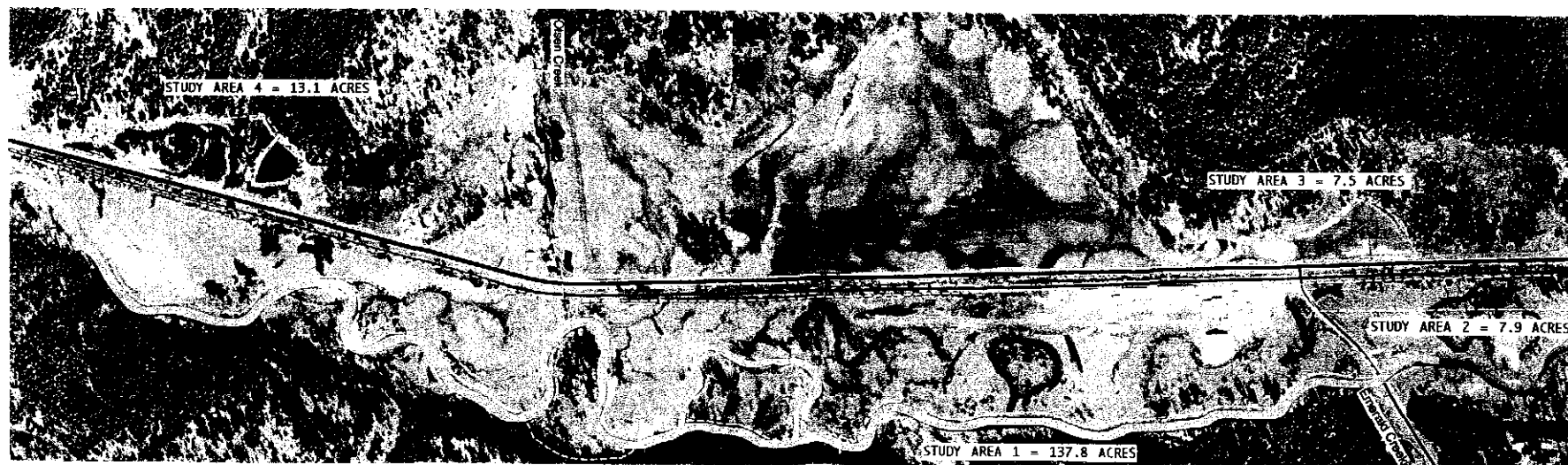


Figure 1.
Vicinity Map
St. Maries River EIS
Emerald Creek Garnet LTD



TOTAL STUDY AREA EXTENT = 356.8 ACRES

FIGURE 2:
PROJECT AREA
ST. MARYS RIVER STUDY AREAS
EMERALD CREEK GARNET LTD

1.2 Project Description

ECG proposes to initiate placer mining of alluvial garnet deposits along portions of the St. Maries floodplain using various dredge mining techniques. In general, topsoil and overburden are stripped and stockpiled, the garnet bearing gravels are extracted with different types of dredge equipment, and the excavated material is taken to an on-site concentration facility. Washed rock from the concentration facility is used as backfill, overburden is replaced, and the site is final graded with topsoil and seeded (ECG 1998). Mining would be conducted incrementally over a period of up to 25 years (Corps 1998).

ECG maintains a 30-foot mining setback, so no actual mining activities occur within 30 feet of the St. Maries River. A silt berm will be constructed in the inner 10 feet of the mining setback, providing a minimum 20-foot native growth buffer. Additionally, no "wet panel" mining will occur within 70 feet of the river.

Additional project details may be found in other permit documents (ECG 1998).

2.0

PURPOSE

This survey was undertaken as part of the permitting requirements associated with the regulatory authority vested by the Clean Water Act of 1975. Under federal law, Emerald Creek Garnet LTD is required to submit this and other documents for an EIS which is required by the US Army Corps of Engineers. Various federal and state agencies have some type of control of habitat and rare plants and animals. The US Fish and Wildlife Service (FWS) administers the Endangered Species Act of 1973. This act provides federal protection for those plants and animals listed endangered and threatened and includes provisions to develop and implement recovery plans for each listed species.

3.1 Background Research

Initial review of background information commenced with identification of which plant species are federally listed as threatened or endangered. Updated lists of rare plant species were obtained from the Conservation Data Center (CDC), Nongame and Endangered Wildlife Program from the Idaho Department of Fish and Game. Information on specific, known historical (recent and documented) locations of rare plants collected or observed within adjacent counties was obtained and analyzed for distance from site, habitat similarities, and elevation. A formal request to the US Fish and Wildlife Service for a list of federally listed plant species was made (USFWS 1998a, Appendix 1). Aerial photographs and 7.5 minute topographic quadrangles of the project areas were studied, then reconnaissance fieldwork was initiated to assess potential habitat.

Additional habitat information, associated species, microtopography, and more site-specific details concerning the plants and the potential for their occurrence were analyzed. Knowledgeable individuals and experts on the specific listed plant species were consulted (Moseley, CDC; Mantas, US Forest Service; and Lesica, University of Montana; all personal communication 1998). The most current or complete rare plant status reports and other documents specific to the species involved were studied (Moseley 1998b, 1997a, 1997b, 1997c; Lesica 1992; Shelly and Gamon 1996; Isle 1997; USFWS 1998b, 1998c; Washington Natural Heritage Program 1997 (and personal communication), Conservation Data Center 1994, 1998 (personal communication), and documents available on the CDC Web Page). Regional texts and plant manuals were also consulted (Hickman ed. 1993, Prescott 1980, Cronquist et al 1977, Hotchkiss 1972, Hitchcock et. al. 1969, Munz and Keck 1959, Davis 1952). In addition, the only known extant population for *Howellia aquatilis* in Idaho was visited several times this season to compare habitat/vegetation characteristics, water levels, depth of pond, associated species, and phenology.

Additional habitat information, associated species, microtopography, and more site-specific details concerning the plants and the potential for their occurrence were analyzed. Experience and information from previous rare plant surveys and wetland delineations occurring in the vicinity of the project area over the last six years were also used (Duebendorfer 1993, 1994, ECG 1994).

3.2 Project Area Surveys

Specific surveys within the 1998 project areas included riparian zones, wetland floodplains, and adjacent uplands. These foot surveys occurred May 26 through 29, July 16 through 18, September 17 through 19, 1998, and June 23, 1999. During some of the site visits, I was assisted by a second biologist. All vegetation communities and plant species encountered during each site visit were identified and compared with habitat information regarding the rare plant species likely to be present in the project area. Every effort was made to produce as complete a plant species list as possible.

All available rare plant species habitat (with occasional spot checks in unsuitable or marginal habitat) was traversed, and in some larger open areas such as the floodplain meadows along the St. Maries River, transects were run throughout the area. Other areas were surveyed by a "directed meander" approach. Suitable habitat was traversed often repeatedly, in a random pattern, until a level of certainty was reached that non-rare species were continually encountered and all suitable rare plant habitat was sufficiently investigated. This process was repeated over three periods during the growing season with an emphasis on the known flowering/fruiting cycle of the species in question.

4.0

RESULTS

This section discusses findings for the preliminary data review and for the field surveys. The following discussion includes results of the literature searches, identification of which rare plant species were targeted and why, suitable habitat and known historical locations of the species. Results of the field surveys includes description of the vegetation associations, habitat information, and comparisons of rare species with similar, but commonly occurring species. A list of all plant species identified in the project area is given in Appendix 2.

4.1 Background Research

Since this project only involves lands in private ownership, only federally listed plant species are included in this survey (USFWS 1998a, Appendix 1). Under the ESA, plants are assigned one of several status categories: endangered is defined as those "Taxa which are in danger of extinction throughout all or a significant portion of their range"; threatened is defined as those "Taxa likely to be classified as Endangered within the foreseeable future throughout all or a significant portion of their range"; and candidate, which is defined as "Taxa for which the USFWS currently has substantial information on hand to support the biological appropriateness of proposing to list as endangered or threatened. Proposed rules have not been issued, but development and publication of such rules are anticipated" (CDC 1994). Early in

1998 the USFWS "downgraded" the status of most candidate species, thus candidate species typically no longer appear on federally-listed rare plant species lists.

According to the USFWS species list only the Listed Threatened (LT) *Spiranthes diluvialis* (Ute ladies'-tresses - ORCHIDACEAE) appears on the list (USFWS 1998a, Appendix 1). However, there is a known location of another LT plant species in Latah County about 20 air miles southwest of the Emerald Creek project. Since this is the only known population of *Howellia aquatilis* (water howellia - CAMPANULACEAE) in Idaho, and its habitat requirements are very similar to some of the habitat within the project area, it seemed prudent to survey for this species as well. Thus, the survey focused on these two plant species (Table 2).

Table 2.
Federally Listed Plant Species Potentially Occurring in the ECG Project Area

Scientific and Common Name	Brief Characteristics	Range of Species	Specific Habitat
<i>Howellia aquatilis</i> A. Gray (water howellia) Listing initiated in 1980; final rule in 1994.	annual, aquatic member of the Campanulaceae (bellflower family)	Idaho, Montana, Washington, Oregon, California	Small, shallow wetland habitats with firm consolidated clay and organic sediment substrates, surrounded by deciduous forest or shrubs. Fall seed germination requires exposure to air followed by submersion and growth in the spring and summer. Thus, the pond must dry out completely in late summer. In water from 3 inch to 3 foot depths.
<i>Spiranthes diluvialis</i> Sheviak (Ute ladies-tresses) First listing in 1992; listed in Idaho in 1996.	perennial, obligate wetland herb in the Orchidaceae (orchid family)	Nebraska, Colorado, Utah, Wyoming, Idaho, Montana, Washington	Low elevation (relative*) wetlands and riparian zones. Alluvial substrates along perennial streams and rivers. Areas that are submerged during spring runoff with well-drained substrates, but the soil surface is kept moist throughout the growing season, fed by capillary fringe from the water table.

* see specific habitat description (Section 4.2)

Preliminary field surveys revealed that the dominant habitats within the study areas include forested riparian, forested upland (borders of slopes and floodplains), scrub-shrub and emergent wetland habitats, and aquatic systems (oxbows and swales). No peat bogs or true lakes were observed within the study area boundaries. Most of the sites within the study areas have been altered from past logging, agricultural activities, and grazing. Vegetation associations in the study areas are described in Section 4.3.1.

The floodplain meadow areas have been altered by clearing, seeding, and grazing. The large floodplain areas associated with the St. Maries River are presently dominated by non-native grasses and forbs with remnant natives. Oxbows and swales often contain aquatic emergent

vegetation with shrub-dominated banks. Deciduous or evergreen forest exists in some study areas.

A comparison of general habitat requirements of the two rare plant species as described in Table 2 with habitats existing within the project area, demonstrates that significant similarities exist. The annual aquatic, *Howellia aquatilis*, could potentially occur in some of the oxbows and isolated ponds, while the perennial wetland herb, *Spiranthes diluvialis*, apparently could occur along the banks of the St. Maries River or adjacent riparian wetland habitats. Specific habitat data, life history, and known location information for the two rare plants is given in Section 4.2.1 and 4.2.2.

4.2 Review of Known Rare Plant Locations and Specific Habitat Requirements

4.2.1 *Howellia aquatilis* Gray

Description

This aquatic annual species is a member of the Campanulaceae (bellflower family) (Plate 1). It grows in water, rooted in vernal freshwater ponds, oxbows, and along edges of lakes. The lax stems are branched from the base and grow to 60 cm (24 inches) tall. The linear or filiform leaves are mostly alternate and up to 5 cm (2 inches) long. The flowers are of two types: (1) cleistogamous (closed, or self-pollinating) flowers are inconspicuous and appear only below the water surface; and (2) the sparse, chasmogamous (opening, and potentially cross-pollinating) flowers appear above the water surface, and have small (1/4 inch across) five-lobed, irregular, white corollas. Flowering typically occurs late May to early July, after which identification becomes more difficult. The linear fruits develop from inferior ovaries. The terminal portion of the plant may or may not extend to the water surface. When it does, the stems and leaves float horizontally on the water and may intermingle with other linear-leaved, floating or shallowly rooted aquatic plants. It is easily overlooked, and there are unrelated species that superficially resemble *Howellia*. Thus, searches for this plant are time-consuming and laborious.

Range

Howellia aquatilis is known from over 100 locations in northwest Montana (Swan River Drainage), one location in north-central Idaho (Latah County), about 50 occurrences in Washington (mostly Spokane County), and five (some historical, some new) locations in California (Mendocino County). Historically it was found in four locations in Oregon (Clackamas, Marion, and Multnomah counties), two additional locations in Washington (Thurston and Mason counties), and one location in Kootenai County, Idaho. The extant Latah County population was discovered around 1968 (Shelly and Gamon 1996; Isle 1997).

The single occurrence of *Howellia aquatilis* in Idaho (Latah County), consists of two small populations located in a small vernal pond and an "older" oxbow pool of a meander of the Palouse River near the junction of State Route 6 and 9, west of Harvard, about 20 air miles from the ECG project site. It was first sighted around 1968, and subsequently confirmed in 1988 (Moseley), others in 1995 and 1996, and re-confirmed by myself in 1998 and 1999.

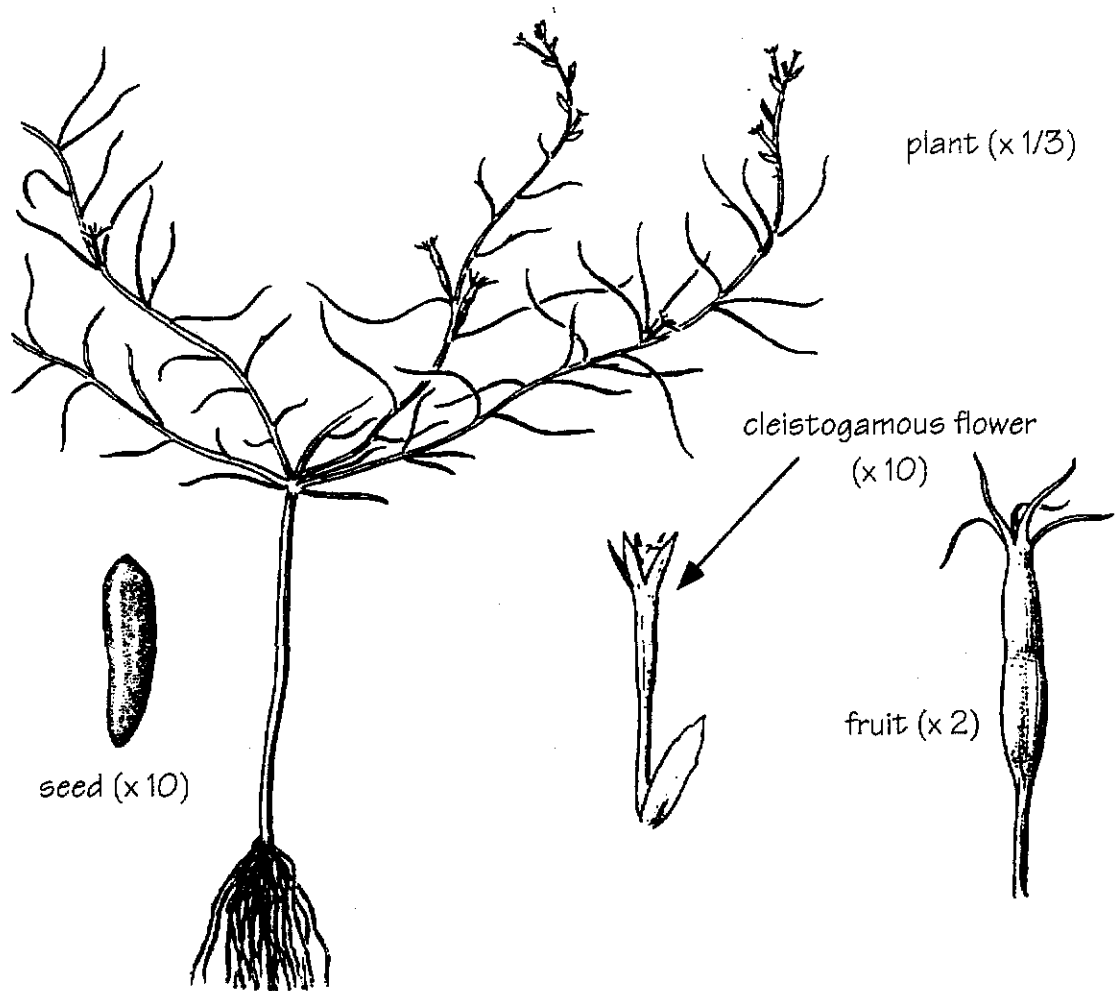
As part of this rare plant survey, I visited the site and re-confirmed the Harvard area population of *Howellia aquatilis* in flower on May 15, 1998. On May 27th, 1998, I identified the 10+ plants growing in about 45 to 76 cm (1.5 to 2.5 feet) of water, with the flaccid flowering stems about 5 to 20 cm (2 to 8 inches) below the water surface. In an adjacent pond, I found a few smaller plants in 15 cm (6 inches) of water growing to within 5 to 10 cm (2 to 4 inches) of the water surface. Both populations exhibited cleistogamous (non-opening, or probably self-pollinating) flowers.

The substrate and general habitat conditions appeared very similar to some pond/oxbow habitats along the St. Maries floodplain. By mid-September 1998, the ponds had dried and the plants were no longer visible.

I re-visited the site again on June 23, 1999. At this time, I observed plants with chasmogamous flowers growing in about 12 to 15 cm (4 to 6 inches) of water with considerable *Eleocharis palustris* "debris". The plants were confined to a 1 m² area. The second smaller pond had more plants confined to an area about 2 m². Associated species were an unidentified *Carex*, *Phalaris arundinacea*, and an aquatic *Ranunculus*.

Habitat

The specific habitat requirements for *Howellia aquatilis* have been described by Lesica (1992). *Howellia aquatilis* occurs in freshwater ephemeral ponds with a shallow, coarse-textured organic surface horizon. Seeds require aerobic environments and cool temperatures to germinate. Thus, seed bank germination is highest immediately following seed dispersal and pond drawdown. This complete drying of the ponds is essential to germination of the seeds. Mantas (personal communication 1998) indicated that presence of high cover of sedges (*Carex vesicaria/rostrata*), reed canarygrass (*Phalaris arundinacea*), cattail (*Typha latifolia*), or similar species, generally preclude the presence of *Howellia aquatilis*. These aggressive rhizomatous, perennial species effectively "fill" the available substrate and thus may inhibit growth of annual species such as the *Howellia*. They do not preclude the growth of *Howellia*, however, but the potential for continued existence of this annual species is compromised by the dense growth of such species. Additionally, the presence of the perennial aquatic, *Ranunculus aquatilis* (water buttercup), indicates that the water in the pond or oxbow is (or probably is) perennial (or at least of longer duration than that optimum for *Howellia* seed germination). Thus it follows that oxbows or ponds with a high cover of relatively aggressive, rhizomatous perennial aquatics or semi-aquatics would not be suitable habitat for *Howellia aquatilis*.



Howellia aquatilis (water howellia) Campanulaceae
Listed Threatened under Endangered Species Act

Associated Species

At the Harvard site, associated aquatic species included *Eleocharis* sp. (spike-rush) and a small non-flowering/fruitletting (and thus unidentified) *Carex*, surrounded by bank species consisting of *Solanum dulcamara* (nightshade), *Cornus sericea* (red-osier dogwood), *Crataegus douglasii* (hawthorn), and *Salix scouleriana* (Scouler willow).

Thus, based on observations and the references cited above, potential habitat for *Howellia aquatilis* does occur within the Emerald Creek Garnet Company LTD EIS Study Areas.

4.2.2 *Spiranthes diluvialis* Sheviak

Description

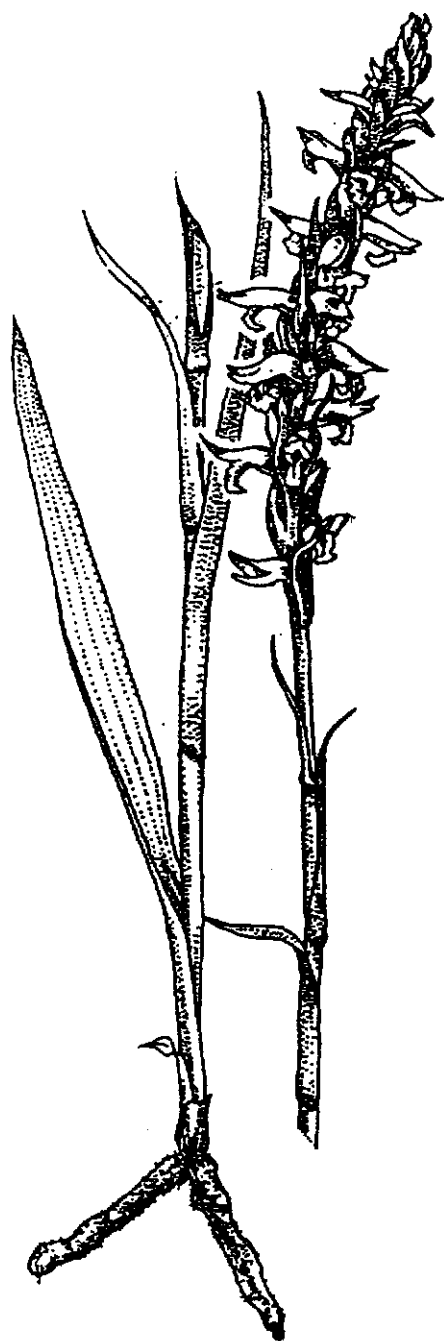
This is a perennial herbaceous species in the Orchidaceae (orchid family). It grows to about 50 cm (20 inches) in height and bears alternate, linear-lanceolate, 1 cm by 28 cm (1/2 to 10 inches) long leaves. The leaves are typically basal, being reduced to small bracts in the upper part of the stem. The leaves often persist after flowering. The inflorescence is a spike, typically bearing numerous, spirally arranged white to yellowish flowers (Plate 2). As is with orchids, the seeds are numerous, tiny, and almost powder like. Because of the lack of endosperm, germination is dependent on a species-specific mycorrhizal association.

Two other species of *Spiranthes* occur in Idaho, one (*S. romanzoffiana*) is relatively common, and generally found in coniferous forests and meadows throughout the state and in the Pacific Northwest in general. The other (*S. porrifolia*) is known from only one population in Idaho (Hells Canyon) and otherwise grows further south and east in the Rocky Mountains. They are not considered sympatric though a few exceptions occur. The rare species, *Spiranthes diluvialis*, is a polyploid and it has been suggested by Sheviak that *S. diluvialis* may have originated through hybridization between *S. magnicamporum* (a Great Plains species) and *S. romanzoffiana* (a more widespread, boreal and subalpine species).

The rare species (*Spiranthes diluvialis*), flowers late August through late-September; whereas the common species (*S. romanzoffiana*), and one most likely to occur in similar areas, flowers in mid-summer (late June to early August).

Range

The historical range of this species was Colorado, Utah, and extreme eastern Nevada. New populations have since been discovered in other portions of Utah and Colorado (Ute Ladies Tresses Recovery Team 1995), as well as eastern Wyoming in 1993 (Fertig 1994), Montana in 1994 (Heidel 1997), Nebraska in 1996 (Hazlett 1996), approximately 20 locations in Idaho (Snake River Basin) in 1996 (Moseley 1997a), and one highly disjunct population in Washington (Okanogan Valley) in 1997 (Heidel 1998; USFWS 1998b). It is discontinuous within its range.



plant (x 1)

Spiranthes diluvialis (Ute ladies' tresses) Orchidaceae
Listed Threatened under Endangered Species Act

In Idaho the known populations are all located in the Snake River floodplain in the far eastern part of the state, in Jefferson, Madison and Bonneville counties. Populations are scattered along 49 river miles from near the confluence of the Henry's Fork, upstream to Swan Valley, nine river miles below Palisades Dam (Moseley 1998b).

Habitat

Its major life zone habitat is sagebrush-steppe to transition zone with montane forest (in lower timberline). Rangewide, all known populations generally occur below the coniferous forest vegetation zone. The populations are within steppe, shrub-steppe, or pinyon-juniper woodland areas. Generally speaking, *Spiranthes diluvialis* is a lowland species occurring on plains, in intermontane valleys, and in narrow mountain valleys. Most populations are in valley bottoms along medium to large streams and rivers of moderate gradient (not slow and meandering). It also occurs in meadows and irrigated pastures, isolated from rivers and streams (Moseley 1998b).

All *Spiranthes diluvialis* populations in Idaho occur on alluvial deposits (very coarse cobbles to fine-sands and sandy loams). Soils are Xeric Torrifluvents. Essentially all Idaho populations are submerged annually or nearly annually during high river flows in late spring/early summer. However it does not occur in the standing-water habitats of adjacent channels nor does it occur on the higher benches where the hydraulic lift is not enough to keep the near-surface soils moist enough. Although Idaho populations are submerged in spring and the coarse-textured soils drain as the season progresses, the soil surface appears to remain moist throughout much of the growing season. By mid-season, the water table may not be at the soil surface but soils are maintained moist by the capillary fringe of the soil water levels.

Spiranthes diluvialis habitat in the single Washington population (in Okanogan Valley) is in the *Purshia-Sarcobatus* (bitterbrush-greasewood) scrub/steppe habitat type. It is not found in the coniferous forest biome.

Associated Species

In Idaho, *Spiranthes diluvialis* is almost exclusively associated with the distribution of the *Elaeagnus commutata* (silverberry) community type. It is found in the Intermountain Semi-desert and Southern Rocky Mountains ecoregions (neither occurring in or near the project site). The best indicator for proper hydrology for *Spiranthes diluvialis* appears to be *Agrostis stolonifera* (redtop bentgrass). *Agrostis stolonifera* openings within riparian shrub communities (*Salix exigua* [coyote willow]) are considered prime habitat (Moseley 1998b).

Specific habitat characteristics in Idaho populations include an alkaline wet meadow and mesic habitats on edge of flood channels (active in spring and inundated spring 1996 at 23,000 cfs). Such habitats are not present in the project areas. The range of Ute ladies' tresses in Idaho coincides with the range of *Elaeagnus commutata* (silverberry). This species is not present in north-central Idaho.

The conclusion of the most complete status report to date on Idaho occurrences of *Spiranthes diluvialis* is given by Moseley (1998b): Prime habitat includes riparian and wetland habitats within sagebrush-steppe and pinyon-juniper woodlands zones below 7000' elevation. Suitable habitat in southern Idaho below 7000' elevation includes lower timberline habitats or in shrub-steppe or woodland transition to montane coniferous forest. These two habitat types occur in the upper Snake River drainage. Potential habitat in northern Idaho could include the steppe zones of the Palouse Prairie, Rathdrum Prairie [around 2500' elevation], and canyon grasslands [to 4500' elevation]]. Montane coniferous forest, subalpine coniferous forest, and alpine zones are considered unlikely habitat.

Thus, based on these observations and documents, the Emerald Creek Garnet LTD EIS Study Areas would not be considered suitable habitat; few of the associated species are present (except *Agrostis stolonifera*) and the hydrologic regime of the St. Maries River does not appear to coincide with the high flows of the Snake River populations. Section 4.3 discusses project area surveys.

4.3 Site-Specific Field Surveys

4.3.1 Vegetation in the Project Area Survey Areas

There are eight general types of vegetation associations in the project area. Four of these types would not be considered suitable habitat for the rare plant species. For completeness of this report, these four types will be described only briefly. They are: coniferous forest, riparian shrub, upland meadow, and marginally wet meadow. Four other vegetation types present within the project meet at least minimum requirements for suitable rare plant habitat. They are: wetland meadow, gravel bar, oxbow/swale, and isolated depressions (ponds).

Coniferous forest is located in a few areas within the project area. It consists of *Pseudotsuga menziesii* (Douglas fir) and *Thuja plicata* (cedar) over *Symphoricarpos albus* (snowberry), *Rosa woodsii* (rose), and *Crataegus douglasii* (hawthorn).

Riparian shrub is largely confined to edges of the smaller creeks, channels and some disturbed areas near the railroad tracks. It consists of patches of *Alnus incana* (white alder), *Crataegus douglasii*, *Cornus sericea* (redstem dogwood), and *Rosa woodsii*, over the herbaceous material typical of upland meadow or marginally wet meadow.

Upland meadow dominates the older floodplain areas no longer periodically flooded. Hydrologic alteration through railroad and road construction have significantly altered original hydrology. Often this association occurs on small topographic rises between remnant oxbow channels. The association is larger herbaceous with the dominant species being grasses: *Phleum pratense* (timothy), *Dactylis glomerata* (orchardgrass), *Festuca rubra* (red fescue), *Poa*

pratensis (Kentucky bluegrass), and *Agrostis stolonifera* (redtop bentgrass). Forbs include *Taraxacum officinale* (dandelion), *Trifolium repens*, *T. dubium*, and *T. pratense* (clovers), *Potentilla glandulosa* and *P. gracilis* (cinquefoil), *Achillea millefolium* (yarrow), *Chrysanthemum leucanthemum* (oxeye daisy) and several species of *Carex* (sedge). These sedges were identified as members of a complex with intergrading characteristics. The complex includes *Carex subfusca*, *C. microptera*, and *C. pachystachya*. These are marginally wetland species. This community is dominated by non-wetland species.

Marginally wet meadow occurs on the floodplain areas and is dominated by herbaceous species. Hydrology of these areas has been altered by past road and railroad construction - thus some of the grass and forb species are typical of wetland meadows and others are facultative inhabiting either wetland or upland meadows. These areas can be dominated by a mix of hydrophytic and upland grasses and forbs: *Phleum*, *Agrostis*, *Poa*, *Trifolium*, *Chrysanthemum*, and *Achillea*. Other species present may include *Alopecurus pratensis* (meadow foxtail), *Camassia quamash* (camas), *Vicia* sp (vetch), and *Lomatium triternatum* (biscuitroot).

Due to lack of inundation (open water) required for the aquatic *Howellia*, and the saturated soils necessary for the *Spiranthes*, the coniferous forest, riparian shrub, upland meadow, and marginally wet meadow associations do not provide suitable or even marginal habitat for these two LT species. Isolated ponds or depressions, however, within any of these associations could be considered potential habitat for the LT *Howellia*.

Wetland meadow areas are dominated by species which can tolerate considerable inundation or soil saturation, but for the purposes of this report, are not considered oxbows/swales or isolated depressions (ponds). Wet meadow can be inundated for a considerable period during the early growing season (perhaps up to one foot in depth), generally drying out toward the end of summer. These areas may be hydrologically linked to river hydrology via subsurface interflow. Elevation (or topographic relief) differences to adjacent areas may be as little as 15 - 30 cm (6 inches to 1 foot). Vegetation may be dominated exclusively by *Alopecurus geniculatus* and *A. pratensis* (water and meadow foxtail), with some *Carex vesicaria* or *C. amplifolia* (sedges). *Phalaris arundinacea* (reed canarygrass) is a common inhabitant of these areas.

While superficially some of these areas may appear to meet the general environmental conditions and habitat requirements of *Spiranthes*, the specific hydrologic regime, soils characteristics, and associated species are largely absent (review Section 4.2.2). The vegetation and hydrological characteristics of the wetland meadow association is not suitable habitat for *Howellia*.

Gravel bars are common along the banks of the St. Maries River and in some areas, within the St. Maries River floodway. The substrate consists of medium to coarse gravels and the bars are

typically inundated during normal spring runoff and high flows. Persistent vegetation usually consists of few scattered *Salix exigua* (willow). After the flows recede and the gravel bars are exposed, plants such as *Juncus bufonius* (toadrush), *Trifolium*, *Ranunculus*, *Agrostis*, *Glyceria grandis* (mannagrass), and *Phalaris* appear. These plants may or may not persist during winter flows and spring runoff scours. A few sandy/gravelly bars are located in oxbows that drain into the river and “back up” with water from the river during high flows.

According to known populations of *Spiranthes* in southern Idaho, these gravel bars could potentially meet the habitat requirements of this rare plant. The field surveys did not yield any populations of *Spiranthes*. Also no mining activity is proposed for areas within or adjacent the floodway.

Oxbows/Swales occur throughout the floodplain areas of the St. Maries River. Oxbows are formed by “mature” river systems, (low gradient and meandering), where a loop in the river becomes breached at the narrow neck resulting in an “abandoned” channel. Some of these channels were breached more recently, others are “older”, that is, shallower and less frequently inundated. A consistent, or widely accepted classification of relative age and character of these floodplain features oxbows was not found in the scientific literature. Thus for the purposes of this report and relevance to rare plant habitat, I will refer to the most recent features as oxbows, and the more aged features, swales. Oxbows are inundated permanently or for long duration and are deep (greater than 3 feet in depth), whereas swales are inundated for a shorter duration, are shallower (less than 3 feet in depth), and may completely dry by end of summer. Both of these are usually hydrologically connected to the river either permanently, or during high flood events (cf. isolated depressions/ponds below).

Most of the oxbows and swales exist south of State Hwy. 3 and the railroad, though a few deeper, seasonally inundated oxbows exist north of the main road (Study Areas 4 and 5).

For the purposes of the surveys for *Howellia*, oxbows or swales that are inundated in the early spring and dry out toward late summer/fall could be potential habitat. Thus surveys in these habitat types/vegetation associations were intensive.

What are referred to in this document as oxbows are those areas that have aquatic vegetation in areas which apparently are almost perennially ponded or flooded. Aquatics such as *Nuphar luteum* (water lily), *Sparganium eurycarpum* (bur-reed), *Callitriche verna* (water starwort), and *Utricularia vulgaris* (bladderwort) typically dominate these perennial aquatic environments. Together with occasional stands of *Crataegus* or *Alnus incana* (white alder) along the banks, *Typha latifolia* is frequently associated with the edge of such aquatic environments. Such oxbow habitats were found not to be suitable habitat for *Howellia* as described in Section 4.2.1.

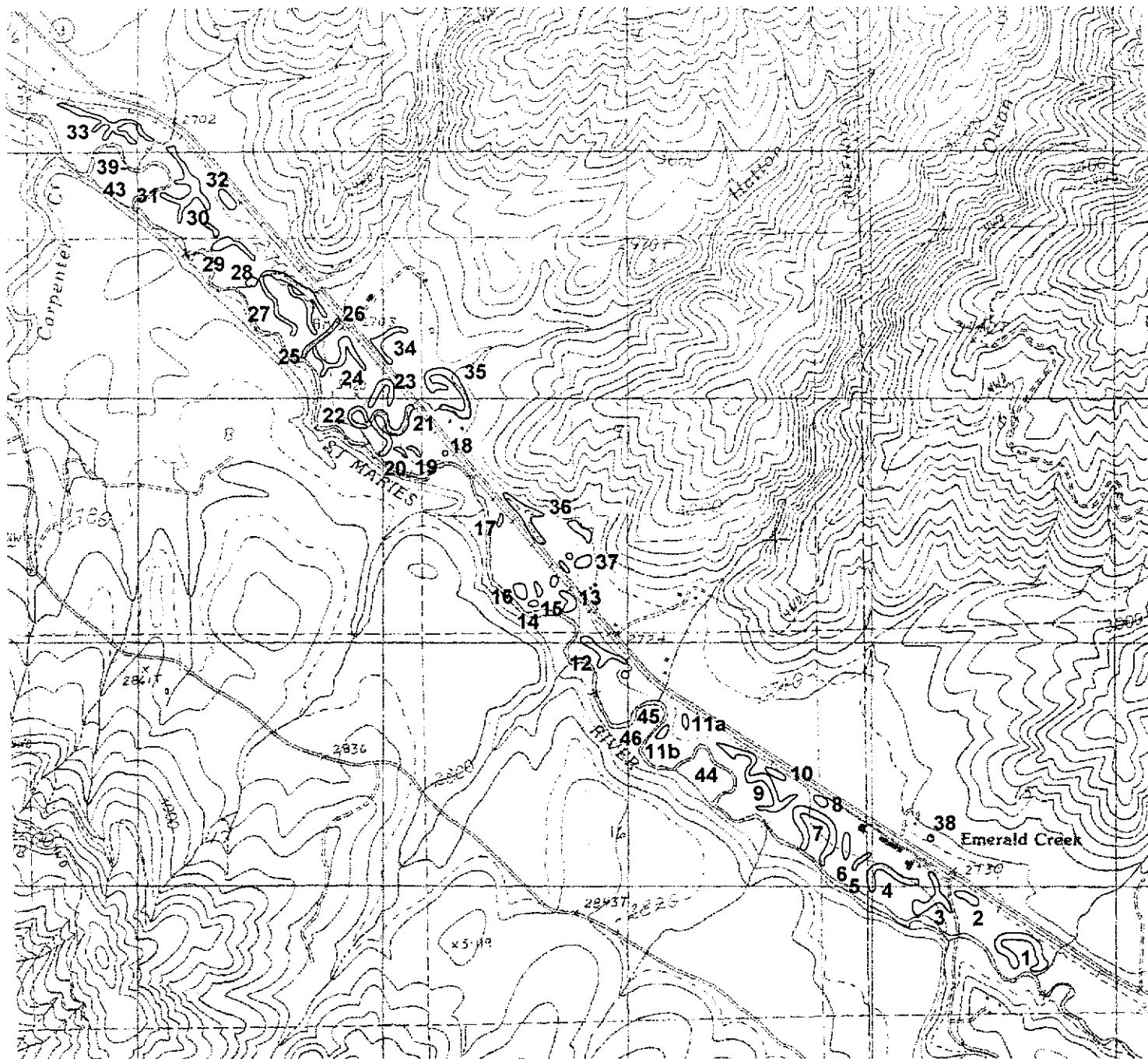
The deepest swales generally had water depths to 1 m (3+ feet), in May, and lost substantial depth as the season progressed. Banks may be steep or sloped. Vegetation in these areas is dominated frequently by *Carex lenticularis*, *Carex vesicaria*, or *Carex aquatilis*. These perennial rhizomatous species form continuous dense swards of vegetation that preclude growth of other species. Occasionally, *Scirpus microcarpus* (small-fruited bulrush), and *Phalaris* are co-dominant in these areas. By late summer/fall, many of these swales had very little or no water remaining in the remnant channels. However, the dense growth of the perennial rhizomatous species appear to preclude the growth of annual aquatic species such as *Howellia*. Some of these swales harbor populations of *Ranunculus aquatilis*, a perennial aquatic buttercup. This species is associated with "perennial" waters (Mantas 1998) and thus areas bearing this species would not likely harbor *Howellia* as it requires complete substrate drying to insure successful germination (Lesica 1992).

Pond and isolated depressions are those areas that may be portions of remnant oxbows, but presently topographically separated from other oxbow areas or swales. Typically these are depressional features that do not have a well defined outlet. Thus water, whether derived from rainwater or from groundwater seepage (from the entire floodplain area), remains in the depressions for most or all of the season. It is this type of aquatic environment that apparently correlates well with known and observed *Howellia* habitat.

Water depths range from 15 cm (6 inches) to 1 m (3 feet) in depth and may be perennial or ephemeral. The banks of these depressions are mostly sloped rather than the steep, abrupt bank edges of active oxbows. Vegetation in the perennial or mostly perennial depressions consists of *Carex vesicaria*, *C. lenticularis*, *Nuphar luteum*, *Veronica scutellata*, *Callitriche verna*, or *Typha latifolia*. Such habitats are not considered viable habitat for *Howellia* because the ponds never really dry out completely (a factor required for successful seed germination).

However, those ponds and depressions that become completely dry late in the season are those that could potentially harbor *Howellia*. Such areas consist of more sparsely vegetated ponds and those with *Carex vesicaria*, *Veronica scutellata*, *Equisetum fluviatile* (an associated species in some *Howellia* occurrences in Montana), and *Alisma plantago-aquatica* (water plantain). Although some of these species form extensive groundcovers that may inhibit growth of annual species (such as *Howellia*), the general environmental factors for growth of *Howellia* appear to be present. Thus, such areas were intensively searched during the season.

Table 3 describes characteristics and vegetation in each oxbow or swale, and the possible reason why *Howellia* was not found. The Map Codes refer to those indicated on Figure 3.



See text for references to numbered oxbow systems

Note: feature #32 is technically not within proposed permit areas
(it was surveyed because of its proximity to project)

scale: 1" = 2000'

source: USGS 7.5' Topo - St. Maries Quad

Duebendorfer 2/24/02

Figure 3.
Oxbow-type Features in Study Areas
St. Maries River EIS
Emerald Creek Garnet LTD

Table 3
Oxbow and Swale Characteristics

Map Code*	Type	Characteristics	Vegetation†	Possible Reason why <i>Howellia</i> not Found‡
1	oxbow	6"-3' deep	Cave, Phar, Elpa, Vesc, Rocu	soft subs.; dense per veg
2	pond/depression	> 4' deep	Crdo, Sasc (borders), Nulu, Cave, Cale, Vesc	presence of culvert indicate flow through system; possible per hydrology; densely veg
3	shaded to open oxbow	6"-3' deep	Poba, Crdo, Alin, (borders), Phar, Cave, Elpa, Rocu	mud (soft) subs.; wood debris high; disturbed system near ECG offices
4	shaded to open oxbow	muddy, to 2' deep	algal mats	highly disturbed, behind ECG offices
5	swale	< 1' deep	Cave, Phar, Rucr, Juef, Caap	dense veg; shallow
6	swale	< 1' deep	Caap, Phar, Alpr, Vesc	dense veg; shallow
7	deep oxbow	> 3' deep	Nulu, Utku, Cave, Phar, Lemn,	steep banks; muddy subs. (turbid)
8	pond	> 3' deep	Nulu, Alae, Scmi, Juef	muddy, soft subs.; portion is shallow emergent
9	oxbow interrupted by shallow areas	2' deep	Cave, Pota, Rare, Speu; other areas, to 1' deep w/Phar, Cave	muddy bottom (turbid)
10	system of deep to shallow oxbows and swales	< 1' d.; gets > 3' d. - more open water, widens - deepens;	Cave (>90% cover); in deep areas, high cover of Gist	mud, very soft subs.; deep with per
11a	pond	< 2' deep	Cave, Alae, Rare, Phar, Caro, Alpl, Utku	soft subs., med to high cover
11b	oxbow from ditch by trees	6 - 20' wide to 3' deep	Scmi, Phar, Caaq	dense veg cover of per; flows to river; soft subs.
12	swale; discharge @ base of slope (near RR); pond @ 1 end	narrow, < 1' deep, 2-8' wide	Scmi, Cave, Alpr, Crdo, Lemn, Raaq	dense cover; per aquatics present
13	oxbow	1-2' deep, 20' wide	Cave, Eqfl, Alpl, Elpa	firm subs.; veg cover high; apparently suitable
14	isolated depression	to 3' deep	Phar, Rocu, Cave, Caaq, Call, Alae	heavy shade; hard subs.; veg low; apparently suitable
15	as in 14	>3' d	20% Scmi, 80% Egfl	heavy shade; hard subs.; veg low; apparently suitable
16	pond	> 3' deep; partially shaded	Tyla, Raal, Cave, Phar	dense per aquatic veg
17	"isolated" pond	> 3' deep	Cave, Scmi, Alpl, Nulu	soft subs.; dense per aquatics
18	ponded oxbow/swale	6" - 3' deep	Poba, Alin, Cave, Phar, Alpr, Alpl	in trees; high per veg cover
19	narrow swale	2' wide; narrow	Cave, Phar, Rocu	high veg cover

Table 3 (continued)
Oxbow and Swale Characteristics

Map Code*	Type	Characteristics	Vegetation†	Possible Reason why <i>Howellia</i> not Found*
20	as in 19	"	"	"
21	oxbow with small pond	to 3' deep; lower end to 40' wide, large system	Cave (high cover) in oxbow; Nulu, Glst, Speu, Alpl, Call, Utvu (in pond)	dense rhiz per in oxbow; per aquatics in pond area
22	as in pond in 21	to 3' deep	Nulu	soft subs., per aquatics
23	pond	upper end of 22	Nulu, Sasc, Poba, Cave, Caaq (100%)	dense rhiz per in oxbow
24	oxbow	very shallow	Cave, Caaq	too shallow; too dense cover of per rhiz species
25	N -> S stream (Pierce Creek)	muddy; shaded	Cave, Caaq, Alpl	flow present, no habitat
26	side channel flowing W from 25	shallow < 2' deep, 6-30' wide; muddy	Cave, Caaq	too dense cover of per rhiz species
27	oxbow swale - complicated system	> 3' wide, < 2' deep; some areas w/open water to 50' wide	Sasc, Alin, Poba; Caaq, Cave, Phar,	good shading (cover), too deep (?); side swales w/ high per rhiz species
28	pond @ W end of 27	shallow to 3' deep	Caaq, Phar, Nulu in ponded areas	too dense, per hydrology
29	pond from shallow swale	pond is wide, empties into River	Crdo, Alin, Poba	per hydrology
30	system of shallow swales, not pond-like, older oxbows	<6" - 1' deep	Phar, Caaq, Cave, Rare	too dense, high cover of rhiz species
31	small ponded areas	1-2' deep	Caaq, Glst, Rare, Crdo, Sasc	soft subs.; veg cover high
32	pond in forest; AREA REMOVED FROM STUDY AREA	to 1' deep	Alin, Rare, Alpl, Rucr, Alae	flow, soft subs.
33	system of oxbows and small ponds in forested area	to 2' deep	Piem, Alin, Rare, Alpl, Rucr, Alae	soft subst.; H ₂ O comes from RR into series of forested pools/swales
34	N of Hwy. 3; swales	shallow within meadow	Alpr, Phar	similar to wet meadow, high veg cover
35	N of Hwy. 3; oxbow pond; pond, swales, open water	shallow to > 3' deep	Cave, Caaq, Rocu, Glst	some areas too densely veg w/per rhiz species; other areas per hydrology
36	pond and oxbow system in largely forested area system	to > 3' deep	Sasc, Alin, Crdo (banks); Cave, Caaq, Glst, Utvu, Alpl	soft subs., turbid; areas with high veg rhiz cover
37	pond	1 - 2' deep	Cave	thick sedge depression
38	stock pond (artificial)?	>> 3' deep	unable to see	no veg; no habitat

Table 3 (continued)
Oxbow and Swale Characteristics

Map Code*	Type	Characteristics	Vegetation†	Possible Reason why <i>Howellia</i> not Found‡
39	pond (open bottom)	1-2' deep	Poba, Sasc, Cost, Rare, Cale, Phar	dry 6/23/99
40	pond (W of 40)	6" water; 12"+ mud	Glyc, Alge, Alpl, Lemi, Cave	soft substrate
41	open depression	>3' deep in middle	Nulu, Cave, Utvu, Pofi, Glyc, Alpl	soft substrate; dom. by perennials
42	small depression	shallow	Cave	dry 6/23/99
43	swale (linear)	shallow	Cale, Cave, Rorippa	dry 6/23/99
44	3 swales	1 with 12" water	Cale, Cave	soft substrate; perennial
45	old narrow channel	2' deep	Alin, Thpl, Lyun, Callitriche, Card	soft substrate, water moving
46	small depression	3' deep	Call, Alge, Phar	dom. by rhiz perennials

* refer to Figure 3

† dominant species in bold; abbreviations given in Appendix 2

‡ subs. = substrate; veg = vegetation; per = perennial; rhiz = rhizomatous

4.3.2 Comparison of Observed Vegetation with Rare Plants

The areas described above in Section 1.1 and identified on Figure 2 were traversed on foot over a period of several months, two to five days per visit. As previously discussed, all plant species found were identified to species and when necessary to varietal or subspecies rank. Appendix 2 lists all plant species observed during the 1998 field surveys.

This section discusses similar and congeneric species, and the potential for misidentification.

Howellia aquatilis is a monospecific genus, which means there is only one species in that genus. Its technical (especially floral and reproductive) characteristics are quite different from any other aquatic species that could inhabit similar areas. However, other unrelated species could superficially resemble vegetative specimens of *Howellia*. Recall that *Howellia* has lax, thin stems with linear, alternate leaves. It is not impressive in its vegetative appearance. Other species that inhabit aquatic areas, such as *Veronica scutellata* (speedwell—a member of the Scrophulariaceae), *Callitriche* spp (water starwort—a complicated genus in the Callitrichaceae), and some species of *Potamogeton* (pondweed—in the Potamogetonaceae) can appear similar to *Howellia* in a general sense. Technically speaking, there is no similarity: *Veronica* has opposite leaves that are linear-lanceolate, while *Callitriche* with its mostly opposite leaves has shorter and linear to spatulate leaves (those nearer the water surface become more spatulate, while the submerged ones are linear). *Potamogeton* has a few species

which appear similar to *Howellia*, but I have found them to be more “limp” and flaccid compared to the vegetative characteristics of *Howellia*. The situation becomes only confusing when one tries to assess the species in murky, turbid waters, or assess the species from a distance of greater than a few meters (a problem typical of the varying-depth oxbows, where the water depth may exceed 1 meter within a few feet from the bank). Thus there are “look-alikes” but no real taxonomic complications.

Spiranthes diluvialis has been recently identified in Idaho. The genus *Spiranthes* contains several species, of which only one may be sympatric. This is the more common and widespread *Spiranthes romanzoffiana* (hooded ladies' tresses). *Spiranthes romanzoffiana* is a wetland plant that is found in the coniferous forest biome, wet meadows, and a variety of habitats; but physically unlike the apparently very specific habitat required for *Spiranthes diluvialis*.

Of those species identified in the 1998 survey areas, only one (*Spiranthes romanzoffiana*) is in the same genus as observed plants. Table 4 shows the salient differences between this ladies' tresses and the rare *Spiranthes diluvialis*.

Table 4.
Rare Plant Species Compared with Observed Species in Same Genus

LT species (on list)	Similar plants observed in the field	Taxonomic Differences
<i>Spiranthes diluvialis</i>		<i>S. diluvialis</i> is generally more robust in every aspect: taller, larger leaves, bigger flowers, etc. One to multiple stems 12-50cm tall; leaves 1cm wide, up to 28cm long. Stems pubescent with obviously stalked glands. Flowers late August through mid-September, rarely to early October. Specific floral differences include separate sepals, white flowers, with the lip mostly exposed in lateral view, and less prominently violin-shaped
	<i>Spiranthes romanzoffiana</i>	<i>S. romanzoffiana</i> is generally smaller in every aspect: shorter stems and leaves. Stems essentially glabrous to short pubescent with sessile to subsessile glands. Flowers July to August. Specific floral differences include connate sepals, cream-colored flowers, with the lip hidden in lateral view (except the tip), and much more prominently pandurate (violin-shaped)

4.4 Summary of Results

No federally listed rare plants were found during the 1998-1999 surveys.

Although vegetation communities within the project area are similar to specific habitat where one of the listed TES species (*Howellia aquatilis*) is found, the 1998 surveys did not reveal the presence of this species in the Study Areas described in Table 1.

5.1 Regulatory Implications

There is always the remote possibility that a small population or scattered individuals of the rare species may occur within the Study Areas, however with the intensity of the 1998 field surveys, this is not likely. Two notes on this statement: Since the *Howellia* is an annual species, it is possible that if a population does exist within the Study Areas, the seeds may not have germinated this season. However, given the 1998 precipitation conditions, if the correct habitat requirements and environmental conditions were present for *Howellia*, one could assume that the seeds should have germinated. In addition, a botanist (R. Bursik) under contract with the Conservation Data Center, Idaho, spent approximately 30 days between June and September 1994 surveying potential habitats in northern Idaho from the St. Joe and St. Maries River drainages, north. No populations of *Howellia* were found during these surveys. Thus it is unlikely that a new Idaho population of *Howellia* occurs within the Study Areas shown on Figure 2.

Since some areas within the Study Area are suitable habitat for listed species, future colonization by threatened or endangered species is also possible. Also, non-listed species occurring within site boundaries may, at some time in the future, become listed. At this time, this document is appropriate for submittal to the lead reviewing agencies.

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Appendix 1
Official Letter from USFWS Listing Species to be Addressed



United States Department of the Interior

FISH AND WILDLIFE SERVICE

*Upper Columbia River Basin Field Office
11103 E. Montgomery Drive, Suite 2
Spokane, WA 99206*

November 10, 1998

Tom Duebendorfer
P.O. Box 167
Elmira, ID 83865

Subject: Threatened and Endangered Species List for Emerald Creek Garnet Company
Project (1-9-99-SP-5; 970.0500)

Dear Mr. Duebendorfer:

This responds to your October 15, 1998, request for the subject species list, received in this office on October 21, 1998. The Emerald Creek Garnet Company is proposing a mining project, located within Township 43 North, Range 1 East, Sections 4-6, 8, 9, 15, and 16, near Fernwood, Idaho. We have enclosed a list 1-9-99-SP-5 (Enclosure A) of endangered, threatened, proposed, and candidate species and species of concern that may be present in the proposed project area. The list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act of 1973 (Act), as amended. The requirements for Federal agency compliance under the Act are outlined in Enclosure B. Please reference the species list number on Enclosure A in all subsequent correspondence, reports, environmental assessments, environmental impact statements, biological assessments (evaluations), Coordination Act reports, etc.

If a listed species appears on Enclosure A, preparation of a biological assessment/evaluation (BA) would be prudent. Even if a BA is not prepared, potential project effects on listed species should be addressed in the environmental documentation for this project. If a BA is not commenced within 90 days of this response, verification of the accuracy of the species list request is required by regulations. Should the BA determine that a listed species is likely to be affected adversely by the project, the lead Federal agency (if any) involved in this project should request formal section 7 consultation through this office. If a proposed species is likely to be jeopardized by a Federal action, regulations require a conference between the Federal agency and the Service.

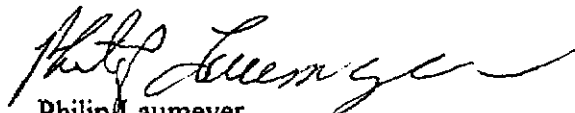
Candidate species and species of concern that appear on Enclosure A have no protection under the Act, but are included for early planning consideration. Proposed species could be formally listed and candidate species could be formally proposed and listed during project planning, thereby falling within the scope of section 7 of the Endangered Species Act. Therefore, if they appear on Enclosure A, we recommend that additional surveys be made for proposed and/or candidate species that are likely to be in the project area. If the project is likely to adversely impact a candidate species, informal consultation with this office is recommended.

The Service recently received a petition to list the westslope cutthroat trout as threatened. Petitioned species receive no protection under the Act. However, a petition is an early step in the

listing process. In its 90-day finding, published in the June 10, 1998 Federal Register (63 FR 31691), the Service found that the petition presented substantial information that listing this species may be warranted. The Service is now surveying the status of the species range-wide, preparatory to making a 12-month finding, due January 25, 1999. You may want to consider the potential effects of the subject project on this species, both to minimize any adverse effect to the species and to simplify consultation responsibilities should the species be proposed or listed before the project is completed.

If you have any questions regarding Federal consultation responsibilities under the Act, please contact Suzanne Audet of this office at (509) 891-6839. Thank you for your continued interest in the Endangered Species Program.

Sincerely,


Philip Laumeyer
Field Supervisor

Enclosures

cc: IDFG, Reg. 1, CdA

Refer to next page

Comments:

1. There are species regulations defining the protection and management of gray wolves designated as nonessential experimental, as outlined in the final rules published in the Federal Register, Vol. 59, No. 223 - November 22, 1994. These regulations include special provisions regarding "take" of gray wolves. For section 7 interagency coordination purposes, wolves designated as nonessential experimental that are not within units of the National Park System or National Wildlife Refuge System are treated as proposed species. As such, Federal agencies are only required to confer with the Service when they determine that an action they authorize, fund, or carry out "is likely to jeopardize the continued existence" of the species.
2. The U.S. Fish and Wildlife Service has been petitioned to list the westslope cutthroat trout as threatened. Petitioned species receive no protection under the Endangered Species Act. However, a petition is an early step in the listing process. The Service has made a positive 90-day finding, published June 10, 1998, in the Federal Register (63 FR 31691), that the petition presented substantial information that listing this species may be warranted. The Service is now surveying the status of the species range-wide, preparatory to making a 12-month finding, due January 25, 1999.

LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES
AND CANDIDATE SPECIES THAT MAY OCCUR WITHIN THE
AREA OF THE EMERALD CREEK GARNET COMPANY PROJECT
FWS-1-9-99-SP-5

LISTED SPECIES

COMMENTS

Gray Wolf (XN)
(Canis lupus)

See Comment 1.

Bull Trout (LT)
(Salvelinus confluentus)

Ute ladies'-tresses (LT)
(Spiranthes diluvialis)

PROPOSED SPECIES

None

CANDIDATE SPECIES

None

SPECIES OF CONCERN

Westslope cutthroat trout*
(Oncorhynchus clarki lewisi)

See Comment 2.

FEDERAL AGENCIES' RESPONSIBILITY UNDER SECTIONS 7(a) AND (c) OF THE ENDANGERED SPECIES ACT

SECTION 7(a) - Consultation/Conference

- Requires: 1) Federal agencies to utilize their authorities to carry out programs to conserve endangered and threatened species;
- 3) Consultation with FWS when a Federal action may affect a listed endangered or threatened species to insure that any action authorized, funded or carried out by a Federal agency is not likely to jeopardize the continued existence of listed species; or result in destruction or adverse modification of critical habitat. The process is initiated by the Federal agency after determining the action may affect a listed species; and
- 3) Conference with FWS when a Federal action is likely to jeopardize the continued existence of a proposed species or result in destruction or adverse modification of proposed critical habitat.

SECTION 7(c) - Biological Assessment for Major Construction Activities ^{1/}

Requires Federal agencies or their designees to prepare Biological Assessment (BA) for major construction activities. The BA analyzes the effects of the action^{2/} on listed and proposed species. The process begins with a Federal agency in requesting from FWS a list of proposed and listed threatened and endangered species (list attached). If the BA is not initiated within 90 days of receipt of the species list, the accuracy of the species list should be informally verified with our Service. The BA should be completed within 180 days after its initiation (or within such a time period as is mutually agreeable). No irreversible commitment of resources is to be made during the BA process which would foreclose reasonable and prudent alternatives to protect endangered species. Planning, design, and administrative actions may be taken; however, no construction may begin.

We recommend the following for inclusion in the BA; an onsite inspection of the area to be affected by the proposal which may include a detailed survey of the area to determine if the species are present; a review of literature and scientific data to determine species' distribution, habitat needs, and other biological requirements; interviews with experts, including those within FWS, State conservation departments, universities and others who may have data not yet published in scientific literature; an analysis of the effects of the proposal on the species in terms of individuals and populations, including consideration of cumulative effects of the proposal on the species and its habitat; an analysis of alternative actions considered. The BA should document the results, including a discussion of study methods used, any problems encountered, and other relevant information. The BA should conclude whether or not a listed or proposed species will be affected. Upon completion, the BA should be forwarded to our office.

^{1/} A major construction activity is a construction project (or other undertaking having similar physical impacts) which is a major action significantly affecting the quality of human environment as referred to in the NEPA (42 U.S.C. 4332 (2)(c)).

^{2/} "Effects of the action" refers to the direct and indirect effects on an action on the species or critical habitat, together with the effects of other activities that are interrelated or interdependent with that action.



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Upper Columbia Fish and Wildlife Office
11103 East Montgomery Drive
Spokane, Washington 99206

March 15, 2002

Tom Duebendorfer
Professional Wetland Scientist, Botanist
P.O. Box 167
Elmira, Idaho 83865

Subject: Species List for the Proposed Emerald Creek Project in Benewah County, Idaho

Reference Number: 1-9-02-SP-0232

Dear Mr. Duebendorfer:

This responds to your February 15, 2002, request for a list of threatened and endangered species that may occur in the vicinity of the proposed Emerald Creek project in Benewah County, Idaho. We understand that the project involves field studies, EIS preparation, and permitting for the project. Please use the above reference number for all future correspondence regarding this project.

We have reviewed the information you provided. Our records indicate that the following listed species may occur in the vicinity of the project and could potentially be affected by it:

Listed Species

Experimental/Non-essential

Gray wolf (*Canis lupus*)

Threatened

Bull trout (*Salvelinus confluentus*)

Ute ladies'-tresses (*Spiranthes diluvialis*)

There are species regulations defining the protection and management of gray wolves designated as nonessential experimental, as outlined in the final rules published in the Federal Register, Vol. 59, No. 223 - November 22, 1994. These regulations include special provisions regarding "take" of gray wolves. For section 7 interagency coordination purposes, wolves designated as nonessential experimental that are not within units of the National Park System or National Wildlife Refuge System are treated as proposed species. As such, Federal agencies are only required to confer with the Service when they determine that an action they authorize, fund, or carry out "is likely to jeopardize the continued existence" of the species.

If there is federal agency involvement in this project (funding, authorization, or other action), the involved federal agency must meet its responsibilities under section 7 of the Endangered Species Act of 1973, as amended (Act), as outlined in Enclosure A. Enclosure A includes a discussion of the contents of a Biological Assessment (BA), which provides an analysis of the impacts of the project on listed and proposed species, and designated and proposed critical habitat. Preparation of a BA is required for all major construction projects. Even if a BA is not prepared, potential project effects on listed and proposed species should be addressed in the environmental review for this project. Federal agencies may designate, in writing, a non-federal representative to prepare a BA. However, the involved federal agency retains responsibility for the BA, its adequacy, and ultimate compliance with section 7 of the Act.

Preparation of a BA would be prudent when listed or proposed species, or designated or proposed critical habitat, occur within the project area. Should the BA determine that a listed species is likely to be affected by the project, the involved federal agency should request section 7 consultation with the U.S. Fish and Wildlife Service (Service). If a proposed species is likely to be jeopardized by the project, regulations require conferencing between the involved federal agency and the Service. If the BA concludes that the project will have no effect on any listed or proposed species, we would appreciate receiving a copy for our information.

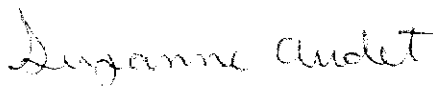
If there is no federal agency involvement in your project, and you determine that it may negatively impact a listed or proposed species, you may contact us regarding the potential need for permitting your actions under section 10 of the Act.

If you would like information concerning state listed species or species of concern, you may contact the Idaho Department of Fish and Game, at (208) 334-3402.

This letter fulfills the requirements of the Service under section 7 of the Act. Should the project plans change significantly, or if the project is delayed more than 90 days, you should request an update to this response.

Thank you for your efforts to protect our nation's species and their habitats. If you have any questions concerning the above information, please contact Carrie Cordova at (509) 893-8022.

Sincerely,



For Supervisor

Enclosure

c: IDFG, Coeur d'Alene
SAIC, Rob Cavallaro

**Responsibility of Federal Agencies under Section 7
of the Endangered Species Act**

Section 7(a) - Consultation/Conferencing

- Requires: 1) Federal agencies to utilize their authorities to carry out programs to conserve endangered and threatened species;
- 2) Consultation with the U.S. Fish and Wildlife Service (Service) when a federal action may affect a listed species to ensure that any action authorized, funded, or carried out by a federal agency will not jeopardize the continued existence of listed species, or result in destruction or adverse modification of critical habitat. The process is initiated by the federal agency after determining that the action may affect a listed species; and
- 3) Conferencing with the Service when a federal action may jeopardize the continued existence of a proposed species, or result in destruction or adverse modification of proposed critical habitat.

Section 7(c) - Biological Assessment for Major Construction Activities

Requires federal agencies or their designees to prepare a Biological Assessment (BA) for major construction activities¹. The BA analyzes the effects of the action, including indirect effects and effects of interrelated or interdependent activities, on listed and proposed species, and designated and proposed critical habitat. The process begins with a request to the Service for a species list. If the BA is not initiated within 90 days of receipt of the species list, the accuracy of the list should be verified with the Service. The BA should be completed within 180 days after its initiation (or within such a time period as is mutually agreeable between the Service and the involved federal agency). No irreversible commitment of resources is to be made during the BA process that forecloses reasonable and prudent alternatives for the project that could protect listed and proposed species. Project planning, design, and administrative actions may proceed, however, no construction may begin.

We recommend the following for inclusion in a BA: an onsite inspection of the area to be affected by the proposal, which may include a detailed survey of the area to determine if listed or proposed species are present; a review of pertinent literature and scientific data to determine the species' distribution, habitat needs, and other biological requirements; interviews with experts, including those within the Service, state conservation departments, universities, and others who may have data not yet published in scientific literature; an analysis of the effects of the proposal on the species in terms of individuals and populations, including consideration of cumulative effects of the proposal on the species and its habitat; and an analysis of alternative actions considered. The BA should document the results of the impacts analysis, including a discussion

of study methods used, any problems encountered, and other relevant information. The BA should conclude whether or not any listed species may be affected, proposed species may be jeopardized, or critical habitat may be adversely modified by the project. Upon completion, the BA should be forwarded to the Service.

Major concerns that should be addressed in a BA for listed and proposed animal species include:

1. Level of use of the project area by the species, and amount or location of critical habitat;
2. Effect(s) of the project on the species' primary feeding, breeding, and sheltering areas;
3. Impacts from project construction and implementation (*e.g.*, increased noise levels, increased human activity and/or access, loss or degradation of habitat) that may result in disturbance to the species and/or their avoidance of the project area or critical habitat.

Major concerns that should be addressed in a BA for listed or proposed plant species include:

1. Distribution of the taxon in the project area;
2. Disturbance (*e.g.*, trampling, collecting) of individual plants or loss of habitat; and
3. Changes in hydrology where the taxon is found.

Section 7(d) - Irreversible or Irretrievable Commitment of Resources

Requires that, after initiation or reinitiation of consultation required under section 7(a)(2), the Federal agency and any applicant shall make no irreversible or irretrievable commitment of resources with respect to the action which has the effect of foreclosing the formulation or implementation of any reasonable and prudent alternatives which would avoid violating section 7(a)(2). This prohibition is in force during the consultation process and continues until the requirements of section 7(a)(2) are satisfied.

¹ A major construction activity is a construction project, or other undertaking having similar physical impacts, which is a major action significantly affecting the quality of the human environment as referred to in the National Environmental Policy Act [42 U.S.C. 4332 (2)(c)].

Appendix 2
Plant Species Encountered during Field Surveys:
Emerald Creek Garnet LTD EIS Study Areas

Stratum	Scientific Name	Abbreviation*	Common Name
Trees	<i>Abies lasiocarpa</i>	Abla	subalpine fir
	<i>Picea engelmannii</i>	Piem	Engelmann spruce
	<i>Pinus contorta</i>	Pico	lodgepole pine
	<i>Populus tremula</i>	Potr	quaking aspen
	<i>Pseudotsuga menziesii</i>	Psme	Douglas fir
	<i>Thuja plicata</i>	Thpl	western red cedar
	<i>Tsuga heterophylla</i>	Tshe	western hemlock
Shrubs	<i>Alnus incana</i> var. <i>tenuifolia</i>	Alin	white alder
	<i>Alnus sinuata</i>	Alsi	Sitka alder
	<i>Cornus sericea</i> (= <i>C. stolonifera</i>)	Cost	redstem dogwood
	<i>Crataegus douglasii</i> var. <i>douglasii</i>	Crdo	hawthorn
	<i>Gaultheria ovatifolia</i>	Gaov	slender wintergreen
	<i>Holodiscus discolor</i>	Hodi	ocean spray
	<i>Lonicera involucrata</i>	Loin	honeysuckle
	<i>Lonicera utahensis</i>	Lout	honeysuckle
	<i>Pachistima myrsinites</i>	Pamy	box
	<i>Rhamnus alnifolia</i>	Rhal	alder-leaf buckthorn
	<i>Rhamnus purshiana</i>	Rhpu	cascara
	<i>Rosa woodsii</i>	Rowo	Woods' rose
	<i>Rubus idaeus</i> var. <i>peramoenus</i>	Ruid	raspberry
	<i>Rubus vitifolius</i>	Ruvi	trailing blackberry
	<i>Salix exigua</i>	Saex	sandbar willow
	<i>Salix scouleriana</i>	Sasc	Scouler willow
	<i>Symphoricarpos albus</i>	Syal	snowberry
Herbs	<i>Achillea millefolium</i>	Acmi	yarrow
	<i>Aconitum columbianum</i>	Acco	monkshood
	<i>Actaea rubra</i>	Acru	baneberry
	<i>Adenocaulon bicolor</i>	Adbi	trail plant
	<i>Adiantum pedatum</i>	Adpe	maidenhair fern
	<i>Agastache urticifolia</i>	Agur	nettle leaf-horsemint
	<i>Agrostis alba</i> (= <i>A. gigantea</i>)	Agal	redtop bentgrass
	<i>Agrostis stolonifera</i>	Agst	redtop bentgrass
	<i>Aira caryophyllea</i>	Aica	hairgrass
	<i>Alisma plantago-aquatica</i>	Alpl	water plantain
	<i>Alopecurus aequalis</i>	Alae	water foxtail
	<i>Alopecurus geniculatus</i>	Alge	water foxtail
	<i>Alopecurus pratensis</i>	Alpr	meadow foxtail
	<i>Anaphalis margaritacea</i>	Anma	pearly everlasting
	<i>Asarum caudatum</i>	Asca	wild ginger
	<i>Aster foliaceus</i>	Asfo	leafy-bracted aster
	<i>Astragalus</i> sp (need fruit for ID)	Astr	locoweed

Appendix 2 (continued)
Plant Species Encountered during Field Surveys:
Emerald Creek Garnet LTD EIS Study Areas

Stratum	Scientific Name	Abbreviation*	Common Name
Herbs	<i>Athyrium filix-femina</i>	Atfi	ladyfern
	<i>Bellis perennis</i>	Bepe	English daisy
	<i>Bromus inermis</i>	Brin	smooth brome
	<i>Calamagrostis canadensis</i> var <i>scabra</i>	Caca	bluejoint reed grass
	<i>Callitriche hermaphroditica</i>	Call	autumnal water starwort
	<i>Callitriche heterophylla</i>	Call	different-leaved water starwort
	<i>Callitriche verna</i>	Call	spring water starwort
	<i>Camassia quamash</i>	Caqu	camas
	<i>Campanula parryi</i> var <i>idahoensis</i>	Capa	bluebell
	<i>Carex amplifolia</i>	Caam	big-leaved sedge
	<i>Carex aquatilis</i>	Caaq	water sedge
	<i>Carex interior</i>	Cain	interior sedge
	<i>Carex microptera</i>	Cami	small-winged sedge
	<i>Carex pachystachya</i>	Capa2	thick-head sedge
	<i>Carex rostrata</i> (cf <i>C. vesicaria</i>)	Caro	beaked sedge
	<i>Carex X stipata</i>	Cast	stalk-grain sedge
	<i>Carex subfusca</i>	Casu	rusty sedge
	<i>Carex vesicaria</i> (= <i>C. exsiccata</i>)	Cave	inflated (beaked) sedge
	<i>Castilleja miniata</i>	Cami2	Indian paintbrush
	<i>Cerastium arvense</i>	Cear	mouse-eared chickweed
	<i>Chrysanthemum leucanthemum</i>	Chle	ox-eye daisy
	<i>Cicuta douglasii</i>	Cido	water hemlock
	<i>Circaea alpina</i>	Cial	enchanter's nightshade
	<i>Cirsium arvense</i>	Ciar	Canada thistle
	<i>Cirsium vulgare</i>	Civu	bull thistle
	<i>Claytonia perfoliata</i>	Clpe	miner's lettuce
	<i>Claytonia sibirica</i>	Clsi	Siberian springbeauty
	<i>Clintonia uniflora</i>	Clun	queen cup beadleily
	<i>Collinsia parviflora</i>	Copa	small-flowered blue-eyed Mary
	<i>Collomia linearis</i>	Coli	narrow-leaf collomia
	<i>Conium maculatum</i>	Coma	poison hemlock
	<i>Conyza canadensis</i>	Coca	horseweed
	<i>Coptis occidentalis</i>	Cooc	western goldthread
	<i>Corallorhiza striata</i>	Cost2	striped coral root
	<i>Corallorhiza maculata</i>	Coma2	spotted coral root
	<i>Cornus canadensis</i>	Coca2	bunchberry
	<i>Cryptantha</i> sp.	Cryp	cryptantha
	<i>Cynoglossum officinale</i>	Cyof	hound's tongue
	<i>Cystopteris fragilis</i>	Cyfr	brITTLEfern
	<i>Danthonia californica</i> var <i>californica</i>	Daca	California oatgrass
	<i>Danthonia unispicata</i>	Daun	one-flowered danthonia
	<i>Deschampsia caespitosa</i>	Deca	tufted hairgrass
	<i>Deschampsia elongata</i>	Deel	slender hairgrass

Appendix 2 (continued)
Plant Species Encountered during Field Surveys:
Emerald Creek Garnet LTD EIS Study Areas

Stratum	Scientific Name	Abbreviation*	Common Name
Herbs	<i>Disporum trachycarpum</i>	Ditr	fairybell
	<i>Eleocharis palustris</i>	Elpa	common spikerush
	<i>Eleocharis parvula</i>	Elpa2	small spikerush
	<i>Epilobium ciliatum</i>	Epci	willow herb
	<i>Equisetum arvense</i>	Eqar	field horsetail
	<i>Equisetum fluviatile</i>	Eqfl	water horsetail
	<i>Equisetum hyemale</i>	Eqhy	rough scouring rush
	<i>Equisetum laevigatum</i>	Eqla	smooth scouring rush
	<i>Equisetum sylvaticum</i>	Eqsy	woodland horsetail
	<i>Festuca arundinacea</i>	Fear	tall fescue
	<i>Festuca pratensis</i>	Fepr	meadow fescue
	<i>Festuca rubra</i>	Feru	red fescue
	<i>Festuca subulata</i>	Fesu	bearded fescue
	<i>Fragaria vesca</i>	Frve	wild strawberry
	<i>Fragaria virginiana</i>	Frvi	wild strawberry
	<i>Galium aparine</i>	Gaap	catchweed bedstraw
	<i>Galium boreale</i>	Gabo	northern bedstraw
	<i>Galium triflorum</i>	Gatr	sweet-scent bedstraw
	<i>Geum macrophyllum</i>	Gema	large-leaved avens
	<i>Glyceria elata</i>	Glel	tall mannagrass
	<i>Glyceria grandis</i>	Glgr	American mannagrass
	<i>Glyceria striata</i>	Glst	fowl mannagrass
	<i>Gnaphalium chilense</i>	Gnch	cudweed
	<i>Goodyera oblongifolia</i>	Goob	rattlesnake plantain
	<i>Gratiola neglecta</i>	Gme	hedge hyssop
	<i>Gymnocarpium dryopteris</i>	Gydr	oak fern
	<i>Heracleum lanatum</i>	Hela	cow parsnip
	<i>Hieracium albertinum</i>	Hial	western hawkweed
	<i>Hieracium cynoglossoides</i>	Hicy	hounds-tongue hawkweed
	<i>Hypericum anagalloides</i>	Hyan	tinker's penny
	<i>Hypericum formosum</i>	Hyfo	western St. John's wort
	<i>Hypericum perforatum</i>	Hype	St. John's wort
	<i>Juncus acuminatus</i>	Juac	taper-tip rush
	<i>Juncus articulatus</i>	Juar	jointed rush
	<i>Juncus bufonius</i>	Jubu	toad rush
	<i>Juncus confusus</i>	Juco	Colorado rush
	<i>Juncus effusus</i>	Juef	soft rush
	<i>Juncus ensifolius var ensifolius</i>	Juen	three-stamen rush
	<i>Juncus ensifolius var montanus</i>	Juen	three-stamen rush
	<i>Juncus tenuis</i>	Jute	slender rush
	<i>Lemna minor</i>	Lemi	duckweed
	<i>Ligusticum verticillifolium</i>	Live	Idaho lovage
	<i>Linnaea borealis</i>	Libo	twinflower

Appendix 2 (continued)
Plant Species Encountered during Field Surveys:
Emerald Creek Garnet LTD EIS Study Areas

Stratum	Scientific Name	Abbreviation*	Common Name
Herbs	<i>Listera cordata</i>	Lico	twayblade orchid
	<i>Lomatium triternatum</i> var. <i>platycarpum</i>	Lotr	nine-leaf lomatium
	<i>Lomatium triternatum</i> var. <i>triternatum</i>	Lotr	nine-leaf lomatium
	<i>Lotus purshianus</i>	Lupu	Spanish clover
	<i>Luzula campestris</i> var. <i>congesta</i>	Luco	field woodrush
	<i>Luzula campestris</i> var. <i>multiflora</i>	Luca	field woodrush
	<i>Luzula parviflora</i>	Lupa	small-flowered woodrush
	<i>Lycopus uniflorus</i>	Lyun	one-flowered bugleweed
	<i>Madia exigua</i>	Maex	small-head tarweed
	<i>Madia glomerata</i>	Magl	mountain tarweed
	<i>Melica subulata</i>	Mesu	Alaska oniongrass
	<i>Mentha arvensis</i>	Mear	field mint
	<i>Mertensia ciliata</i>	Meci	ciliate bluebells
	<i>Mertensia paniculata</i>	Mepa	tall bluebells
	<i>Mimulus guttatus</i>	Migu	yellow monkey flower
	<i>Mimulus guttatus</i> var. <i>depauperatus</i>	Migu	yellow monkey flower
	<i>Mimulus moschatus</i>	Mimo	musk flower
	<i>Mitella caulescens</i>	Mica	leafy mitrewort
	<i>Osmorhiza chilensis</i>	Osch	mountain sweet-cicely
	<i>Osmorhiza occidentalis</i>	Osoc	western sweet-cicely
	<i>Penstemon confertus</i>	Peco	yellow penstemon
	<i>Penstemon globosus</i>	Pegl	globe penstemon
	<i>Penstemon rydbergii</i>	Pery	Rydberg's penstemon
	<i>Phacelia idahoensis</i>	Phid	phacelia
	<i>Phalaris arundinacea</i>	Phar	reed canarygrass
	<i>Phleum pratense</i>	Phpr	common timothy
	<i>Plantago lanceolata</i>	Plla	common plantain
	<i>Plantago major</i>	Plma	English plantain
	<i>Platanthera saccata</i>	Plsa	slender bog orchid
	<i>Poa palustris</i>	Popa	fowl bluegrass
	<i>Poa pratensis</i>	Popr	Kentucky bluegrass
	<i>Poa trivialis</i>	Potr2	rough stalk bluegrass
	<i>Polemonium occidentale</i>	Pooc	Jacob's ladder
	<i>Polystichum munitum</i>	Pomu	sword fern
	<i>Potamogeton diversifolius</i>	Podi	diverse-leaved pondweed
	<i>Potamogeton filiformis</i>	Pofi	slender-leaved pondweed
	<i>Potamogeton nodosus</i>	Pono	long-leaved pondweed
	<i>Potamogeton pectinatus</i> (?)	Pope	fennel-leaved pondweed
	<i>Potentilla glandulosa</i>	Pogl	sticky cinquefoil
	<i>Potentilla gracilis</i>	Pogr	cinquefoil
	<i>Pteridium aquilinum</i>	Ptaq	bracken fern
	<i>Pterospora andromedea</i>	Ptan	pine drops

Appendix 2 (continued)
Plant Species Encountered during Field Surveys:
Emerald Creek Garnet LTD EIS Study Areas

Stratum	Scientific Name	Abbreviation*	Common Name
Herbs	<i>Pyrola aphylla</i>	Pyap	leafless wintergreen
	<i>Pyrola asarifolia</i>	Pyas	common pink wintergreen
	<i>Pyrola picta</i>	Pypu	white-vein wintergreen
	<i>Pyrola uniflora</i>	Pyun	woodnymph
	<i>Pyrola secunda</i>	Pyse	one-sided wintergreen
	<i>Ranunculus alismaefolius</i> var <i>alismaefolius</i>	Raal	plantain-leaved buttercup
	<i>Ranunculus aquatilis</i>	Raaq	white water buttercup
	<i>Ranunculus orthorhynchus</i> var <i>platyphyllus</i>	Raor	straightbeak buttercup
	<i>Ranunculus repens</i>	Rare	creeping buttercup
	<i>Ranunculus uncinatus</i>	Raun	little buttercup
	<i>Rorippa curvisiliqua</i>	Rocu	western yellowcress
	<i>Rudbeckia occidentalis</i>	Ruoc	black head coneflower
	<i>Rumex acetosella</i>	Ruac	sheep sorrel
	<i>Rumex crispus</i>	Rucr	curly dock
	<i>Rumex occidentalis</i> (= <i>R.</i> <i>fenestratus</i>)	Ruoc2	western dock
	<i>Rumex salicifolius</i> (= <i>R.</i> <i>mexicanus</i>)	Rusa	willow leaved dock
	<i>Sanguisorba occidentalis</i>	Saoc	burnet
	<i>Saussurea americana</i>	Saam	American sawwort
	<i>Scirpus cyperinus</i>	ScCy	wool-grass
	<i>Scirpus microcarpus</i>	Scmi	small-fruited bulrush
	<i>Scrophularia lanceolata</i>	Scla	scrophularia
	<i>Senecio hydrophilus</i>	Sehy	alkali-marsh butterweed
	<i>Senecio triangularis</i>	Setr	arrow-leaf groundsel
	<i>Smilacina stellata</i>	Smst	star Solomon's seal
	<i>Solidago elongata/gigantea</i>	Soel	goldenrod
	<i>Sparganium eurycarpum</i>	Speu	broad-fruited bur-reed
	<i>Spiranthes romanzoffiana</i>	Spro	hooded ladies' tresses
	<i>Stellaria longipes</i>	Stlo	chickweed
	<i>Streptopus roseus</i>	Stro	rosy twisted-stalk
	<i>Taraxacum officinale</i>	Taof	common dandelion
	<i>Tauschia tenuissima</i>	Tate	Leiberg's tauschia
	<i>Thalictrum occidentale</i>	Thoc	western meadow-rue
	<i>Tiarella unifoliata</i>	Tiun	coolwort foamflower
	<i>Trautvetteria grandis</i> (= <i>T.</i> <i>caroliniensis</i>)	Trgr	false bugbane
	<i>Trifolium agrarium</i>	Trag	yellow clover
	<i>Trifolium dubium</i>	Trdu	suckling clover
	<i>Trifolium pratense</i>	Trpr	red clover
	<i>Trifolium repens</i>	Trre	white clover
	<i>Trillium petiolatum</i> (= <i>T.</i> <i>angustipetalum</i>)	Trpe	trillium
	<i>Triteleia laxa</i> (?)	Trla	triteleia

Appendix 2 (continued)
Plant Species Encountered during Field Surveys:
Emerald Creek Garnet LTD EIS Study Areas

Stratum	Scientific Name	Abbreviation*	Common Name
	<i>Urtica dioica</i>	Urdi	stinging nettle
	<i>Urticularia vulgaris</i>	Utvu	bladderwort
	<i>Veratrum californicum</i>	Veca	false hellebore
	<i>Verbascum thapsus</i>	Veth	common mullein
	<i>Veronica americana</i>	Veam	American brooklime
	<i>Veronica officinalis</i>	Veof	common speedwell
	<i>Veronica persica</i>	Vepe	Persian speedwell
	<i>Veronica serpyllifolia</i> var <i>humifusa</i>	Vese	thyme-leaved speedwell
	<i>Vicia americana</i> var <i>truncata</i>	Viam	American vetch
	<i>Viola ocellata</i>	Vioc	pinto violet
	<i>Viola orbiculata</i>	Vior	round-leaved violet
	<i>Viola palustris</i>	Vipa	marsh violet

* abbreviations used in Table 3